

**INTERSTATE ELECTRONICS CORPORATION***Subsidiary of Interstate Engineering Corporation*

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Here is your copy of the data bulletin for the new SYSTEM 285 Cathode Ray Tube Recorder recently announced by Interstate Electronics Corporation.

Improved features of the SYSTEM 285 include resolution of 900 line pairs over a 10-inch recording width, recording speeds of over 300,000 inches per second, and a recording bandwidth of dc to 10 megahertz.

The SYSTEM 285 Recorder is ideal for applications requiring a real-time recorder with microsecond response, high accuracy and the capability of producing permanent recordings within seconds. Included are radar and telemetry data analysis, high frequency vibration recording, facsimile and video recording as well as pulse rate/shape analysis and many others.

Optional features of the SYSTEM 285 include log/linear video amplifier, sweep generator with adjustable sweep time from 30 microseconds to 100 milliseconds, selectable sweep delay and marker generator, and 8 galvonometers for recording 8 channels of auxiliary data time correlated with the video data.

The system accepts either film or UV recording paper.

You are invited to call the Marketing Department/Data Products Division of Interstate Electronics Corporation, Anaheim, or the IEC Regional Office nearest you for further information on the SYSTEM 285 Recorder and assistance in its application to your system requirement.

Very truly yours,

INTERSTATE ELECTRONICS CORPORATION

A handwritten signature in cursive script that reads "John H. Clark".

John H. Clark
Marketing Manager
Data Products Division

REGIONAL OFFICES

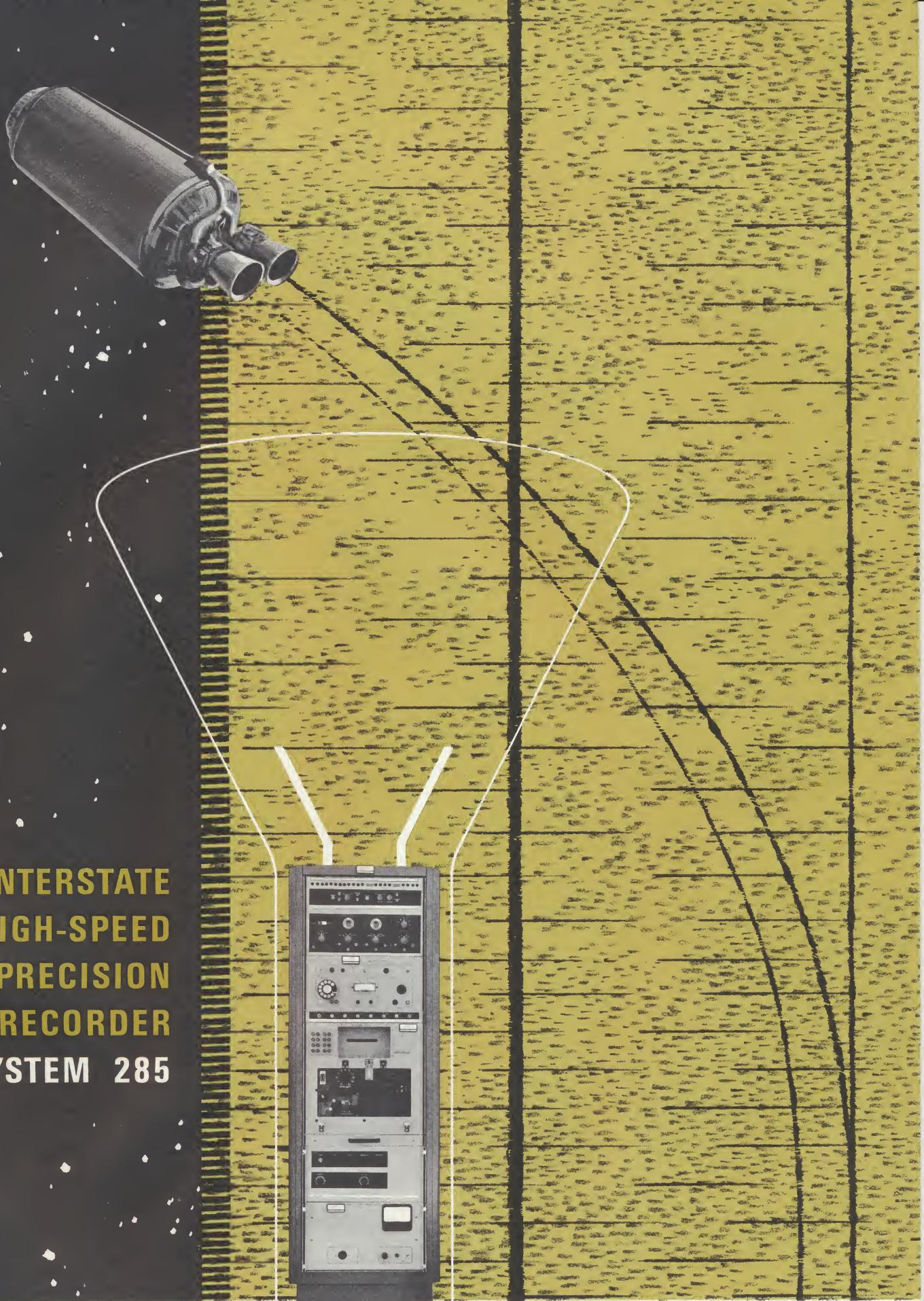
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**THE INTERSTATE
HIGH-SPEED
PRECISION
CRT RECORDER
SYSTEM 285**



 **IEC**

SYSTEM 285

GENERAL DESCRIPTION

Interstate Electronics' precision, high-speed System 285 Recorder delivers precise real-time recorded data useful where microsecond response, accuracy and permanency are required.

It incorporates a high-intensity, high-resolution cathode-ray tube and a precision optical system. The design allows a new level of high frequency pulse data analysis and preserves the output for permanent record. Magnified images from the cathode-ray tube are combined with traces from conventional galvanometers and these synchronized data are precisely recorded onto a single 12-inch-wide moving medium such as film or light-sensitive paper.

The highly precise System 285 records three variable parameters on the medium as a result of its horizontal sweep, lateral film movement, and intensity-modulated beam. In operation, the trace image is obtained from the intensity-modulated CRT beam which is deflected along the horizontal axis. This beam is magnified and focused for projection through a narrow-slot aperture on a recording magazine. The recording medium is passed by the aperture where it is exposed to the trace image. Time-coherent video data are correlated on the film and appear as easily seen continuous lines or bands—noise appears as non-coherent random dots.

The system uses conventional film or paper oscillographic recording magazines. An auxiliary viewing mirror and viewing slot allow visual monitoring of the tube face during recording.

System 285 accommodates up to 8 conventional galvanometers. It also provides a method of record identification by pulse-coding one of the galvanometer traces.

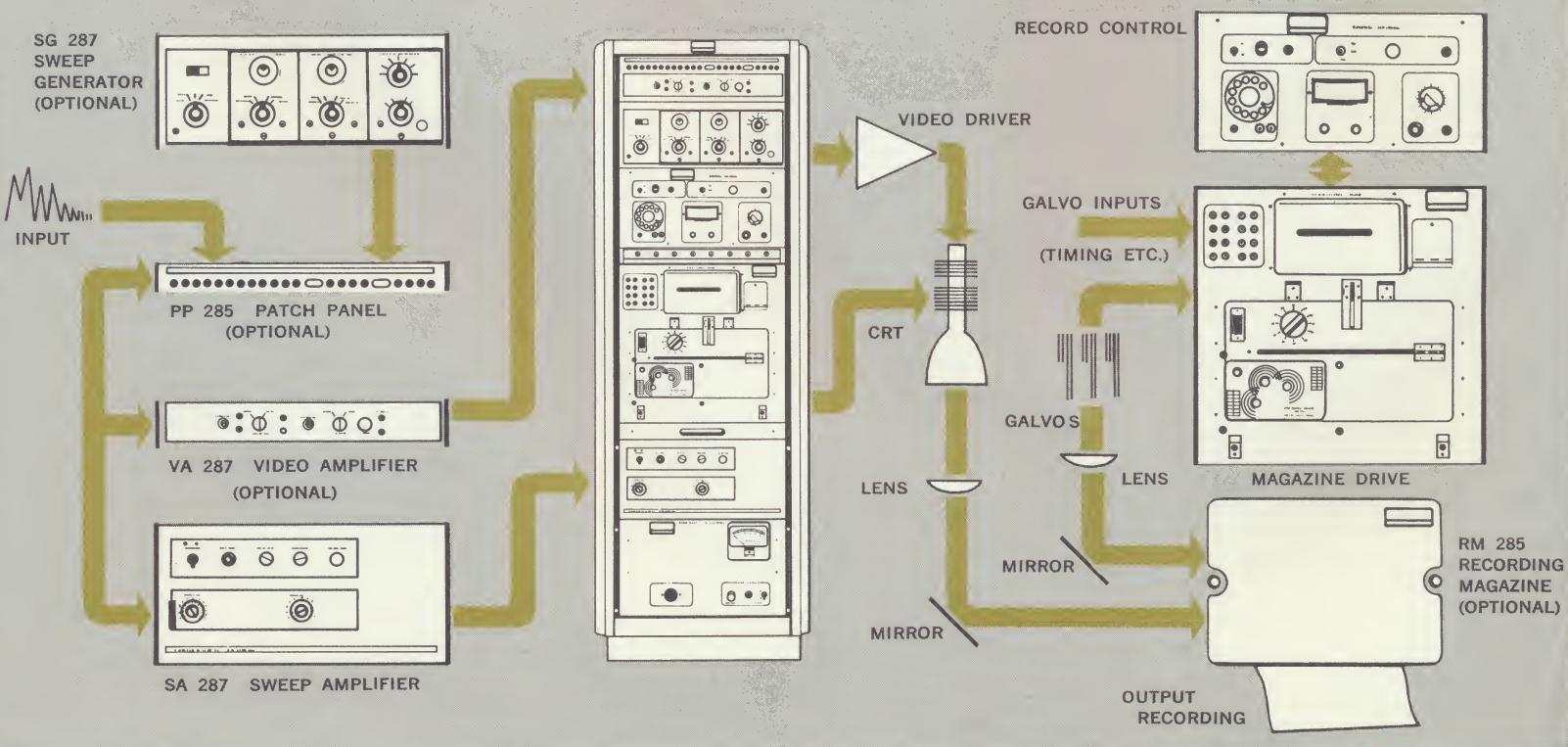
FEATURES

- Combines images from high-resolution cathode-ray tube and conventional galvanometers for high-frequency data presentation and timing correlation.
- Records at spot-image speeds as high as 300,000 inches-per-second on 12-inch-wide film or paper.
- Provides resolution greater than 800-line pairs per 10 inches of recording media.
- CRT is intensity modulated by a dc through 10 MHz video amplifier.
- Designed for visual monitoring of tube face while recording.
- Record identification included.
- All solid-state with exception of the CRT and its associated high-voltage supply.
- Optional equipment includes—sweep/delay and marker generator, video amplifier, patch panel, and record magazines.

APPLICATIONS

Depending on the auxiliary modules and equipment used, the System 285 can provide—in direct readout form—an extremely accurate method of:

- Signal Analysis
- Pulse-Rate or Pulse-Shape Analysis
- Telemetry Signal Analysis
- High-Frequency Vibration Analysis
- Slow-Scan Television Display
- Radar Data Visual Recording
- Co-ordinated Time-Base Display
- Facsimile and Video Recording



CRT PRECISION RECORDER

SPECIFICATIONS

BASE OR285 — PRECISION CRT RECORDER (Includes SA-287 Sweep Amplifier)

CRT Sweep Presentation

Width 10" nominal

CRT Record Resolution

*800 signal elements per sweep minimum

Galvo Presentation Width

1 1/8" nominal

Cathode Ray Tube

Type IEC No. 9280526

Size 5" diameter, 4 3/4" flat surface

Optical System

Lens f3.5. Focal Length 135 MM

Mirror

Optically flat, front surfaced and ruggedized

Galvanometers

Block Midwestern Instruments, 8 galvos maximum

Type (not included) Any standard pencil galvo 5 1/2" focal length

Magazine Drive Linkage

Flexible coupling and timing belt to minimize vibration

Recording Media

Paper or film, 12" wide

Magazines (not included)

IEC RM285 (CEC Type 5-006A)

IEC RM285-1 (CEC Type 5-036D)

Drive Speeds

0.16 ips to 160 ips normal
Other ranges on special order

Power Requirements

115Vac, 60 Hz, 450 watts

Configuration

All equipment front panel mounted in standard 69" high, 24" wide, and 24" deep cabinet. Space provided for SG287, RM285, VA287 and PP285

Video Amplifier

Input Signal

Positive video 1V P/P max. with 0 to +0.2Vdc baseline

Input Impedance

91 ohms

Output

Positive 20V max. video on minus 20Vdc baseline

Bandwidth

dc to 10 MHz ± 3 db

*800 Line Pairs on photo paper. Film offers 900 Line Pairs.



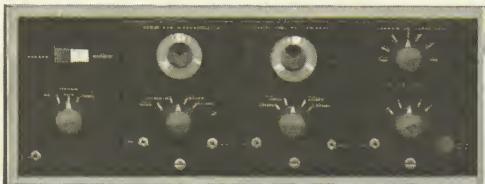
**PP285
VIDEO**

**PATCH PANEL
(Optional)**



Coaxial 24 terminal for all input and monitoring signals. Patch accepts BNC connectors from rear. Nine spare positions and patch cords provided. Fits in System 285 rack.

**SG287
HORIZONTAL
SWEEP/Delay
GENERATOR
(Optional)**



Available with selectable Time Interval Markers used for radar range marks or time measurements.

**SWEEP
GENERATOR**

Range (4 steps)	(1) 30 microsec. to 100 microsec. (2) 100 microsec. to 1 millisecond. (3) 1 millisecond. to 10 milliseconds. (4) 10 milliseconds. to 100 milliseconds.
Vernier Adjustment	10-turn hi-resolution potentiometer gives direct reading of sweep time on each band. Full scale setting, each band accurate to $\pm 3\%$
Sweep Linearity	$\pm 0.2\%$ F.S.
Sweep Output	0 to ± 10 Vdc Linear Ramp
Maximum Load	200 ohms and 200 pf to ground
Sweep Mode	Triggered or free-running with delayed sweep
External Sweep Trigger	Positive or Negative polarity min. 2V. Zero to peak rise time, 1.0 microsec. or less
Sweep Delay Generator Range (4 steps)	(1) 10 microsec. to 100 microsec. (2) 100 microsec. to 1 millisecond. (3) 1 millisecond. to 10 milliseconds. (4) 10 milliseconds. to 100 milliseconds.
Vernier Adjustment	10-turn hi-resolution potentiometer gives direct reading of delay time on each band. Full scale on each band accurate to $\pm 3\%$
Delay Resetability	To 0.2% F.S.
Delay Mode	Triggered or free-running with sweep generator
External Delay Trigger	Positive or Negative polarity, 2V peak-to-peak Rise time, 1.0 microsec. or less
Sweep Resetability	To 0.2%

**MARKER
GENERATOR**

Marker Interval	0.5, 1, 2, 3, 4, or 5 nautical miles
Marker Width	0.3, 3, 10 and 20 microseconds
Drift	0.004% per $^{\circ}\text{F}$.
Output	± 12 Vdc into 100 ohms and 250pf

**VA287
VIDEO
AMPLIFIER
(Optional)**



Input Positive or Negative video 0.2 to 5 volts peak-to-peak, based on 0Vdc level ± 0.2 V

Output dc based, 1.0 volt positive into 91 ohms
Response Linear and logarithmic (1 decade standard, 2 decades available) dc through 10 MHz ± 3 db

**RM285
RECORDING
MAGAZINE
(Optional)**



CEC Type 5-036D, modified for use with System 285.

All specifications subject to change without notice.

THEORY OF OPERATION

The System 285 Precision CRT Recorder records (on a continuous 400-foot-long roll of 12-inch-wide photosensitive paper or 250-foot roll of film) the trace image obtained from an intensity-modulated, cathode-ray tube beam which is deflected along the horizontal axis only.

The result is a composite record made up of individual horizontal lines created by the sweep signal on which a second dimension is imposed by the longitudinal motion of the recording material. Video information, applied as the beam intensity modulating signal, can thus be displayed as dots of light and dark areas on individual sweep traces.

When the optional Patch Panel is used (PP285), all CRT signal selection and distribution is accomplished at this panel where video drive, trace blanking, horizontal deflection (sweep) and sweep trigger signals are available. Without the Patch Panel option, all CRT signal interconnections are made at jacks located on the rear of individual chassis.

Incoming video signals are amplified and conditioned by the optional video amplifier (VA287). Either linear or quasi-logarithmic response can be selected by a front panel switch.

A sweep signal which drives the horizontal deflection coil is generated by an optional Sweep Generator (SG287) or it can be generated externally. The signal is applied to the coil through the Sweep Amplifier (SA287). In the Sweep Amplifier are the primary CRT electronic circuits, deflection amplifier, trace intensity, focus and centering controls and two low-voltage power supply modules.

An optional, portable interchangeable Recording Magazine (RM285)

contains a roll of photosensitive paper or film. The light beam from the face of the CRT is magnified and focused for projection through a narrow slot on this recording magazine. The photosensitive material in the light-tight recording magazine is transported past the aperture where it is exposed to the trace image . . . providing a permanent, high-resolution record of high-frequency video information.

The System 285's cathode-ray tube employs precision electro-magnetic deflection. The housing is provided with alternate laminations of a special magnetic shielding material to protect the electron beam from deflection by stray magnetic fields.

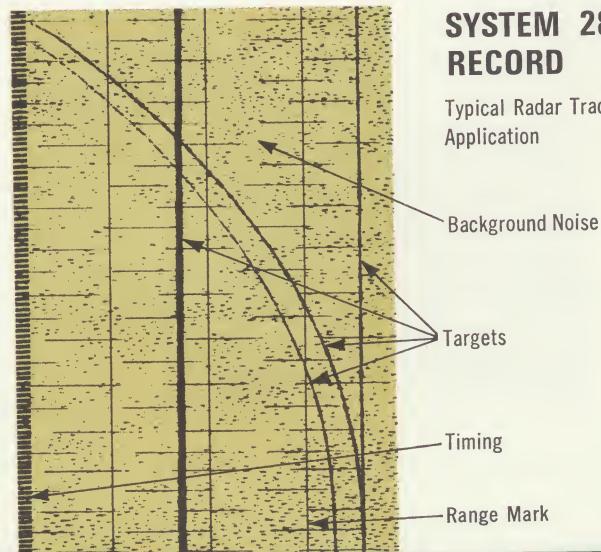
The cathode-ray tube has a clear, flat, non-browning face. It uses P-11 phosphor for generation of the visible trace. This phosphor provides a short-persistence, blue trace as required for high-efficiency photographic recording.

A built-in galvanometer trace recording capability ensures record identification and recording of supplementary analog or digital data. The galvo traces are directed to the recording magazine aperture for recording alongside the cathode-ray tube trace.

The galvanometer optical path originates at the galvanometer lamp located at the base of the path enclosure. The light beam is projected to mirrors on each galvanometer. The galvanometer mirrors reflect the light to a fixed mirror which directs the light beam through a collimation lens and onto the surface of the photosensitive material in the recording magazine. The fluctuations of the trace recording thus obtained reflect fluctuations in the applied electrical signal.

SYSTEM 285 RECORD

Typical Radar Tracking Application



INTERSTATE

Interstate Electronics embraces a wide diversity of interests and activities affecting this age of scientific revolution. Since IEC's inception in 1956, every significant national defense program — including Atlas, Titan, Apollo, Polaris—has utilized the uncommon capability of this organization. IEC is the prime contractor on test instrumentation for the Fleet Ballistic Missile Weapon System (POLARIS / POSEIDON) Program. The firm holds the United States Navy's coveted Certificate of Merit, awarded for "timely and superior technical services" considered "invaluable" in assuring the program's success. Structurally, IEC is composed of three divisions, each availing to a specific field of enterprise a unique combination of talent and experience:

Systems Development Division designed, developed and fabricated the highly advanced test instrumentation for the Navy's POLARIS system and is performing similarly for the follow-up POSEIDON missile program. Its experience extends to other sophisticated test instrumentation, data acquisition and data handling systems.

Data Products Division specializes in the design and manufacturing of real-time hard copy video recorders, sophisticated phase-lock devices, timing equipment and complete data handling systems.

Oceanics Division is a recognized leader in the youthful industry involved with the exploration and study of hydro-space. Its capabilities include, but are not limited to, analysis of wave conditions . . . harbor designs . . . development and installation of deep ocean instrumentation-buoy systems . . . and solutions to customer problems requiring specialist talents in oceanography, etc.

For sales engineering consultation, contact your local representative or IEC Anaheim.

SYSTEMS
DEVELOPMENT
DIVISION



DATA
PRODUCTS
DIVISION



OCEANICS
DIVISION



INTERSTATE ELECTRONICS CORPORATION
DATA PRODUCTS DIVISION



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